课程详述

COURSE SPECIFICATION

以下课程信息可能根据实际授课需要或在课程检讨之后产生变动。如对课程有任何疑问，请联系授课教师。

The course information as follows may be subject to change, either during the session because of unforeseen circumstances, or following review of the course at the end of the session. Queries about the course should be directed to the course instructor.

1.	**课程名称 Course Title**	基础有机化学实验 Basic Experiments for Organic Chemistry
2.	**授课院系** **Originating Department**	材料科学与工程系 Department of Materials Science and Engineering
3.	**课程编号** **Course Code**	MSE212
4.	**课程学分 Credit Value**	1
5.	**课程类别** **Course Type**	专业核心课 Major Core Courses
6.	**授课学期** **Semester**	春季 Spring
7.	**授课语言** **Teaching Language**	英文 English
8.	**授课教师、所属学系、联系方式（如属团队授课，请列明其他授课教师）** **Instructor(s), Affiliation& Contact** **（For team teaching, please list all instructors）**	廖成竹，工程师，材料系，荔园 2 栋 502 liaocz@sustc.edu.cn, 0755-88018761 LIAO Chengzhu , Engineer, Department of Materials Science and Engineer, Room 502, Block 2, Lychee Hill liaocz@sustc.edu.cn, 0755-88018761 章剑波，实验员，材料系，荔园 2 栋 502 zhangjb@sustc.edu.cn, 0755-88018764 ZHANG Jianbo, laboratory assistant, Department of Materials Science and Engineer, Room 502, Block 2, Lychee Hill zhangjb@sustc.edu.cn, 0755-88018764 李慧丽，实验员，材料系，荔园 2 栋 502 lihl@sustech.edu.cn, 0755-88018930 LI Huili, laboratory assistant, Department of Materials Science and Engineer, Room 502, Block 2, Lychee Hill
9.	**实验员/助教、所属学系、联系方式** **Tutor/TA(s), Contact**	无 NA
10.	**选课人数限额(可不填)**	无 NA

	Maximum Enrolment（Optional）	

11.	**授课方式 Delivery Method**	**讲授 Lectures**	**习题/辅导/讨论 Tutorials**	**实验/实习 Lab/Practical**	**其它(请具体注明) Other（Please specify）**	**总学时 Total**
	学时数 Credit Hours	4	0	28	0	32

12.	**先修课程、其它学习要求 Pre-requisites or Other Academic Requirements**	MSE210 基础有机化学 General Organic Chemistry CH101A 化学原理 A General Chemistry A
13.	**后续课程、其它学习规划 Courses for which this course is a pre-requisite**	无 NA
14.	**其它要求修读本课程的学系 Cross-listing Dept.**	无 NA

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

本课程主要目的是培养学生掌握有机化学实验安全及注意事项，掌握蒸馏、重结晶、萃取、色谱分离等基本操作技能，使学生正确掌握有机化合物的分离、提纯、分析、鉴定及基本的合成方法，加深对有机化学基本理论与概念的理解，增强分析问题、解决问题的能力，培养学生掌握规范书写报告的能力，独立实验的能力和团队合作的能力。

The main purpose of this course is to train the students with safety rules, basic organic experiment skills, such as distillation, recrystallization, extraction, and chromatography techniques in organic chemistry. The students are expected to master the basic skills of separation, purification, and synthesis of organic compounds, as well as to strengthen their understandings of basic theory and concept of organic chemistry, hence to enhance their ability to analyze and solve problems of organic chemistry. The students are expected to learn how to write a report after each experiment and to master the ability to do experiments independently and the ability to work together in a team.

16. 预达学习成果 Learning Outcomes

1.掌握有机化学实验安全注意事项和相应规章制度。
2. 掌握有机化学实验中蒸馏、重结晶、萃取、色谱分离等基本操作技能。
3. 掌握有机化合物的分离、提纯、分析、鉴定及基本的合成方法。
4. 掌握实验数据处理和分析的方法，具备规范的实验报告写作能力。
5. 通过学生独立操作实验设备和分组合作等形式，培养学生独立实验的能力和团队合作的能力。

1. To master the safety precautions and relevant rules and regulations in organic chemistry experiments.
2. To learn the basic operation skills such as distillation, recrystallization, extraction, and chromatography techniques in organic chemistry.
3. To master the basic skills of separation, purification, and synthesis of organic compounds.
4. To learn the methods for processing and analysing the experimental data, and then to write a formal report after each experiment.
5. To train students' ability of the independence and teamwork cooperation in the experiments, through the independent operation of the experimental equipment and the group cooperation.

17. 课程内容及教学日历 （如授课语言以英文为主，则课程内容介绍可以用英文；如团队教学或模块教学，教学日历须注明主讲人）
Course Contents (in Parts/Chapters/Sections/Weeks. Please notify name of instructor for course section(s), if this is a team teaching or module course.)

（一） 教学第二周 （4 学时）：Week 2 (4 credit hours)
主要内容：1. 实验课程介绍；2. 安全培训。
Contents: 1. Introduction. 2. Safety training.

（二） 教学第四周 （4 学时）：Week 4 (4 credit hours)
实验一：从红酒中蒸馏提取酒精 Isolation of Alcohol from Red Wine by Simple Distillation
主要内容：1. 了解简单蒸馏的原理；2. 熟悉简单蒸馏的操作； 3. 测定红酒中酒精度数并测量馏分的密度。
Contents: 1. Understand the principle of simple distillation. 2. Be familiar with the operation of simple distillation. 3. Determine the percentage of EtOH in wine “alcohol by volume” (ABV) by distillation and subsequent measurement of the density of the distillate.

（三） 教学第六周 （4 学时）：Week 6 (4 credit hours)
实验二：萘的重结晶 Recrystallization and Melt Point Determination of Naphthalene
主要内容：1. 了解重结晶的原理；2. 学习如何选择重结晶的合适溶剂； 3. 熟悉回流、热过滤和真空抽滤的操作；4. 学习有机化合物重结晶分离提纯的技术。5. 测定萘的熔点。
Contents: 1. Understand the principle of recrystallization. 2. Learn how to choose a suitable solvent for recrystallization. 3. Be familiar with the operation of reflux, hot gravity filtration and vacuum filtration. 4. Study the recrystallization and isolation purification technique for organic compounds. 5. Determine the melting point of naphthalene.

（四） 教学第八周 （4 学时）：Week 8 (4 credit hours)
实验三：液液萃取分离混合物 Separating Compounds of a Mixture by Liquid-liquid extraction
主要内容：1. 学习普通过滤、真空抽滤、液液萃取和旋转蒸发的操作技术；2.掌握液液萃取分离有机化合物；3. 根据有机化合物的酸碱特性，改变其在有机溶剂和水溶剂的溶解性。
Contents: 1. Learn some basic operations such as gravity filtration, vacuum filtration, liquid-liquid extraction and rotary evaporator. 2. Learn how different organic compounds can be isolated according to their acid-base properties, which change their solubility in the organic and aqueous solvents, using liquid-liquid extraction.

（五） 教学第十周 （4 学时）：Week 10 (4 credit hours)
实验四：索氏提取葵花籽油 Isolation of Sunflower Oil from Seeds by Solid-liquid Extraction (Soxhlet)
主要内容：1. 学习固液萃取技术；2.熟悉液液萃取、简单蒸馏和水蒸气蒸馏的操作；3. 学习利用索氏提取技术从葵花籽中提取葵花籽油。
Contents: 1. Learn the solid-liquid extraction technique. 2. Review some basic operations such as liquid-liquid extraction, simple distillation and steam distillation. 3. Learn how to set up Soxhlet extraction to obtain oil from sunflower seeds.

（六） 教学第十二周 （4 学时）：Week 12 (4 credit hours)
实验五：色谱技术分离菠菜中的色素 Separation of the pigments from spinach leaf
主要内容：1.了解柱层色谱和薄层色谱技术的原理和操作；2.熟练操作过滤和液液萃取；3.利用柱层色谱技术和薄层色谱技术分离菠菜中的色素。
Contents: 1.Understand the principle and the operations of column chromatography (CC) and thin layer chromatography (TLC). 2.Be familiar with the gravity filtration, liquid-liquid extraction. 3.Extract photosynthetic pigments and separate them by CC and TLC techniques.

（七） 教学第十四周 （4 学时）：Week 14 (4 credit hours)
实验六： 阿司匹灵的合成 Synthesis of Aspirin (Acetylsalicylic Acid)
主要内容：1. 复习重力过滤、真空抽滤和重结晶的基本操作；2.学习从水杨酸和乙酸酐制备阿司匹林；3.掌握鉴定乙酰水杨酸的方法。
Contents: 1. Review some basic operations such as gravity filtration, vacuum filtration and recrystallization. 2. Learn how to obtain aspirin from salicylic acid and acetic anhydride. 3. Master the method of determining acetylsalicylic acid.

（八） 教学第十六周 （4 学时）：Week 16 (4 credit hours)
实验七：阿司匹林的红外光谱测试 FTIR measurement of Aspirin
主要内容：1.了解红外光谱的原理；2.掌握红外光谱技术；3.学习红外谱图分析化学结构。
Contents: 1. Learn the FTIR principle. 2. Master how to obtain FTIR spectrum. 3. Understand how to analyse the

chemical structure via the FTIR spectrum.

18. 教材及其它参考资料 Textbook and Supplementary Readings

自编实验教材 Experimental Manual

课程评估 ASSESSMENT

19.

评估形式 Type of Assessment	评估时间 Time	占考试总成绩百分比 % of final score	违纪处罚 Penalty	备注 Notes
出勤 Attendance		10		
课堂表现 Class Performance		30		
预习报告 Pre-reports		10		
实验报告 Experimental Reports		50		

20. 记分方式 GRADING SYSTEM

■ A. 十三级等级制 **Letter Grading**
☐ B. 二级记分制（通过/不通过） **Pass/Fail Grading**

课程审批 REVIEW AND APPROVAL

21. 本课程设置已经过以下责任人/委员会审议通过
This Course has been approved by the following person or committee of authority